Aortic Valve Commissurotomy Under Direct Vision

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• Symptomatic stenosis of the aortic valve was treated in ten patients by commissurotomy under direct vision during hypothermia. Seven patients survived and were improved.

THE SURGICAL correction of aortic stenosis has had only limited success with previous methods. The following is a description of direct-vision commissurotomy on the aortic valve, with a report of ten cases.

The first attempt at treatment of aortic valvular stenosis was by Tuffier[3] in 1913—dilatation of the valve by invagination of the wall of the aorta; the single patient operated upon survived ten years with apparent improvement. The next attempt at commissurotomy was not done until 1950, when Bailey[1] successfully passed a dilator retrograde through the carotid artery and into the stenotic aortic valve. Later he used a transventricular approach to the aortic valve, but this approach was unsatisfactory and was abandoned for a third method described by Bailey in 1953—sewing a pouch on the aorta through which a finger could be inserted to dilate the valve. This blind transaortic approach was an improvement over the transventricular route, but caused aortic insufficiency in some cases; moreover, the commissures did not always yield to the pressure of the finger or even of a dilator.

In 1955 one of us (J. H. K.), with Kaiser and Gaertner,[2] experimented on direct surgical exposure of the aortic valve. Since then, ten patients with severe aortic valvular stenosis have been treated by this method, which permits the surgeon to open the stenotic area adequately while avoiding damage to the valve which would cause insufficiency.

Before operation the anesthetized patient was cooled in an ice-and-water bath until the esophageal temperature was reduced to 33°C. In eight patients the surgical approach was through a median sternotomy; in the other two, through a bilateral anterior opening in the third intercostal space. Temporary ligatures were placed around the superior cava proximal to the azygos vein and around the inferior cava. A ligature was placed around the tip of the right atrial appendage for retraction. A heavy silk ligature was passed around the aorta just proximal to the origin of the great vessels. The adventitia was dissected off the aorta and a 4-0 arterial silk stay suture was placed on the right lateral wall of the aorta at the sinus of Valsalva. A curved aortic clamp was applied to the lateral wall of the aorta as close as possible to the base of the heart. A vertical incision 3.5 cm. long was made in the excluded portion of the aortic wall. The superior and inferior venae cavae were occluded and the aorta was cross-clamped just below the origin of the great vessels. The clamp was removed from the lateral wall of the aorta and residual blood was aspirated from the ascending aorta and the left ventricle.

Under direct vision the fused and often calcified commissures were then cut with scissors. This required only a few minutes. The tie around the inferior cava was then released and the resumption of flow from the left ventricle flushed all air from the proximal aortic segment. The clamp was reapplied on the lateral side of the aorta, thereby isolating the aortic incision. The clamp occluding the aorta was removed and next the tie on the superior cava was removed.

Preoperative left heart catheterization had been done in eight of the ten patients operated upon and had revealed pronounced aortic stenosis with differences of pressure as high as 170 mm. of mercury across the aortic valve. Three of the patients died. The other seven were much improved and returned to normal activity.

One death, following combined mitral and aortic commissurotomy, resulted from pulmonary embolism on the fourth postoperative day. Another death occurred at operation when the heart could not be restarted after a satisfactory commissurotomy had been done on a tightly stenotic valve; at necropsy the mitral valve was found to be so stenotic that it admitted only the tip of an index finger, and the tricuspid valve opening was reduced to one-fourth or less of normal. Although a vigorous attempt had been made to improve the patient's cardiac status in the months before, she was in failure at the time of operation. The third death resulted, six weeks postoperatively, from rupture of the thoracic aorta at the line of the incision. At necropsy there was no evidence of healing at this site.

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DISCUSSION

Direct vision permits satisfactory relief of the aortic valvular stenosis; results are good in comparison to those achieved by other methods and there is much less danger of causing aortic insufficiency than by various blind techniques. On the other hand, the danger of aortic stenosis with such symptoms as orthostatic inadequacy, angina or left ventricular failure is emphasized by the fact that two patients being prepared for this operation died before compensation could be restored.

Left heart catheterization, with measurement of the pressure gradient across the aortic valve, makes the diagnosis of this condition considerably more accurate and permits a better assessment of how functionally serious it is in a given case.

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REFERENCES

1. Bailey, C. P.: Surgical treatment of aortic stenosis, J. Thoracic Surg., 31:375-441, 1956.

2. Kaiser, G. C., Gaertner, R. A., and Kay, J. H.: Surgical exposure of the aortic valve, Surgery, 40:1030-1044, 1956.

3. Tuffier, T.: Etat actuel de la chirurgie intrathoracique, Trans. Internat. Cong. Med., London, 1913, Sect. 17, Surg. Part 2, page 249, 1914.

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